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Value Of "Live-At-Home" Practices For Citrus Growers

citrus grove management

Isabelle S. Thursby
Extension Economist in Food Conservation, State Agricultural Extension Service

Confronted with a business recession at the end of what promised to be one of the brightest years for farmers and other rural folk, plans for home demonstration work must be concentrated more earnestly than ever before on the "Live-At-Home" program. Florida has tourists who, in a wide area, provide a market for the surplus from gardens, orchards and poultry flocks, hence conditions among rural families need not be as serious as in other less favored localities.

Keeping in mind the fear and the helplessness that grips people in very lean years, Extension Service programs must be worked out to fortify against pessimism. If the ideal, "A more abundant life for every farm family," is ever realized, a plan must be devised by which all rural people living in the salubrious climate of Florida, and on any but marginal land, can be persuaded to grow and conserve enough of the necessary foods to assure good health, a prerequisite for ambition and achievement.

Sound economics of farming, more today even than in former years, indicate that as much as possible of the family living be produced at home. An adequate productive scheme, to which the year-round garden, calendar orchard, poultry flocks, home dairy and a well planned and budgeted pantry make important contributions, is essential.

(Grapefruit and orange groves in Florida necessarily are more or less neglected during periods when market returns do not equal production costs. Grove owners nevertheless seldom feel disposed wholly to abandon their citrus plantings. Taxes and in many cases interest on deferred payments must be kept up if the properties continue to be occupied. In seasons of abnormally low prices, such as that for 1937-38, the growers find their fiscal problems more and more acute. Is it possible that in part they may be solved through practice of the "Live-At-Home" system for many years advocated by the State Agricultural Extension Service? Gardening and food conservation activities in the women's work of the agency already are carried on over considerable citrus belt territory. Expansion possibilities for central and southern Florida areas doubtless will be suggested to numerous readers by Miss Thursby's analysis and review of last year's work.—Editor The Citrus Industry)

William Bartram who visited Florida in 1773 found here a variety of products that he had seen in no other part of the world. He spoke in glowing terms of their use as ornamentals, of their nutritional values and of their palatability.

One hundred and fifty years later we have not learned to use some of these. It is high time that we take stock of the natural beauties and bounties and develop our unique native resources.

All-The-Year Gardens

Promotion of all-year gardens, permanent and varied fruit plantings adapted to the particular localities, their cultivation, the preparation and utilization of the surplus products according to the latest knowledge of canning technology in order that the family have a balanced and healthful food supply regardless of adverse weather conditions, composes a large part of the program of the Economist in Food Conservation. In addition, the income obtained through lowering cash expenditures for food and by the sale of surplus fruits and vegetables, both

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State Plant Board Problems

Wilmon Newell
Plant Commissioner
At Meeting Of State Horticultural Society

For some years past, this society has given little consideration to the subject of major plant pests in their relation to the horticultural industries of the state. Doubtless this has been due to the fact that during this period the growers have not been face to face with an emergency, such as that which existed during the prevalence of citrus canker, and, later during the occurence of the Mediterranean fruit fly.

Calamities and near-calamities are soon forgotten but what has happened in the past is likely to happen again. True, the same insects and diseases which have twice threatened the very existence of the Florida citrus industry may not recur again — although even this is questionable — but other dangers, unknown and unheard of today, will appear in the picture. Why? Because that is history. There have been incursions of destructive pests of agriculture since the beginning of civilization and there will continue to be during all time to come.

Our growers collectively have, I fear, largely forgotten the trying lessons they learned during the citrus canker and Mediterranean fruit fly experiences. It may be appropriate, therefore, to occasionally review the history of major pest invasions of the state and take cognizance of certain fundamental facts which we must continue to recognize and deal with if our horticultural industries are to escape heavy losses from plant pests in the future.

In this discussion I am not referring to the common grove and garden pests which we have perpetually with us, but only to those with destructive capacity so great that when they do appear it must necessarily be a case of eradicating them or losing an industry. Citrus canker and Mediterranean fruit fly clearly come within this category.

Citrus canker, an unknown and unnamed disease of citrus, appeared in Florida in 1912. So rapidly did it spread and so devasting was its attack on citrus trees that the growers were thrown into a panic. All known methods of checking a plant disease were tried without effect and, in desperation, the growers themselves began burning infected trees in the effort to check its spread. Finding themselves unable to even restrict the spread of citrus canker the citrus industry, ably supported by transportation, banking and business interests, secured passage by the Florida legislature, in 1915, of the Florida Plant Act, creating the State Plant Board as an agency to deal with such emergencies. At about the same time these groups secured monetary assistance from Congress for the fight against citrus canker.

There followed a most unique and unusual piece of warfare. Federal and State agencies joined with the growers in a strenuous effort to stay progress of the disease. From the beginning there was no thought other than to wipe from the state of Florida every vestige of citrus canker. In other words, to eradicate it, despite the fact that no plant disease had ever before been eradicated. At first the working forces were made up almost entirely of growers. Gradually inspectors were recruited and trained in methods of detecting and dealing with the disease and presently federal and state agencies took over the task.

Many were the harrowing experiences, both for growers and inspectors. No measure proved of value other than the complete destruction of infected trees and those which had been exposed to infection. These the owners gave up with little protest, oftentimes seeing the savings of a lifetime disappear in the roaring flames which destroyed their trees. Inspectors, on their part, often worked from daybreak until dark, striving desperately to destroy infected trees before the disease could spread from them. Men applied the flaming oil spray until they fell from exhaustion or were overcome by heat: others stepped forward to take their places. Sundays and holidays were unknown. Inspectors, in endeavoring to locate all trees which had been shipped from infected nurseries, endured trying hardships, traveling miles on foot where other means of transportation were not available, facing hordes of mosquitoes and even swimming creeks and rivers to reach their objectives. Occasionally, also, misinformed grove owners became abusive and on more than one occasion threatened inspectors with violent death. Despite all these difficulties, the inspectors worked ceaselessly on and within a year and a half had the satisfaction of seeing a decrease in the rate of spread of the disease.

At this point, permit me to say that there never has been a more loyal, patriotic army of public servants than this same group of Plant Board employees. And it is small credit to the state of Florida that the compensation they received was less than that of a union carpenter or bricklayer.

This campaign was waged intensively for seven years. By 1924 it appeared likely that canker could be eradicated, and, although not known at the time, the last smouldering spark of canker was snuffed out in 1927. The campaign of eradication cost a total of $2,422,314.63, of which the federal government supplied $1,070,578.25 and transportation and growers' interests $87,369.91. Fifteen thousand, two hundred forty-three grove trees and 342,260 nursery trees were destroyed, and these, together with volunteer services and the $87,000 just mentioned, constituted the contribution of the citrus industry ifself. At this cost, was eliminated from the state a disease which would unquestionably have made citrus fruit growing totally unprofitable, and without profits no industry can survive.

However, he who sleeps in blissful ignorance is likely to awake with a jolt. Citrus canker is not yet entirely eradicated in all parts of the South and it is still prevalent in many citrus growing countries of the world. Only one thing stands between Florida's citrus industry and another invasion of this dread disease and that is the ceaseless and continuous quarantine work of your State Plant Board, supplementing that of the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture.

A few years elapsed and in April, 1929, the citrus growers were rudely awakened to the fact that the Mediterranean fruit fly, most dreaded of all fruit pests, had found lodgment in Florida. The experiences of the months following were indeed distressing ones, both for the growers and the federal and state agencies directing the eradication activities.

Scientists and authorities most conversant with the situation were agreed that at least five years of effort would be required to eradicate the Mediterranean fruit fly--if indeed, it could be eradicated at all. Yet in less than 18 months after its discovery in Florida the Federal Government pronounced eradication complete and removed (November 15, 1930) from Florida products all restrictive quarantines which had been imposed because of the fly. In all, expenditures in eradicating the Mediterranean fruit fly amounted to $6,852,636.95, of which $6,471,161 was defrayed by the Federal Government.

Any discussion as to whether the Mediterranean fruit fly did or did not occur in Florida is hardly necessary. The evidence that it was here, that it was firmly established and that adults and larvae occured by the thousands, is irrefutable. True, there are those who still maintain that because THEY did not see a Mediterranean fruit fly, it could not have been here. Those same individuals would perhaps insist today that there is no Hitler in Germany or Musso-

lini in Italy, because they have not personally met those gentlemen.

On August 10, 1934, the black fly, previously a citrus pest of magnitude in the Bahamas, Cuba and the Canal Zone, made its appearance in Key West. Immediately your State Plant Board undertook its eradication even though there had been no instance of its having been eradicated in other countries. This campaign was waged under most difficult circumstances, as the population of Key West, having no commercial fruit industry, was entirely indifferent as to whether the pest might spread to the citrus belt of the mainland and cause heavy losses to the state's largest agricultural industry. It is not likely that any group of public servants was ever subjected to as many vile insults as were the Plant Board inspectors, who for three years, hung doggedly to the task of eradicating the black fly. Expenditures on black fly eradication (to February 28, 1938) amounted to $154,993.66.

Intensive inspections have been made throughout the campaign, and particularly close inspection has this week been completed. No black fly has been found since February 26, 1937. Black fly has been eradicated from the Island of Key West.

It is fortunate that this has been achieved coincidentally with the opening of the overseas highway to Key West. With thousands of automobiles and trucks traveling over this highway, no system of quarantine inspection, however rigid, could for long prevent such an insect as the black fly from reaching the mainland.

While the black fly cannot be considered as being in a class with citrus canker or Mediterranean fruit fly, so far as destructive ability is concerned, it is nevertheless true that the establishment of this insect in the citrus groves of Florida would entail heavy expense for additional spraying, as well as, in all probability, very considerable expenditure from public funds in suppressing the the pest in abandoned and neglected properties and on non-citrus hosts.

Thus we see that within the past 23 years, the state's citrus industry has twice been saved from what would have been virtual ruin, once through the eradication of citrus canker and again through the eradication of Mediterranean fruit fly. Also a heavy additional expense burden has been averted through the success which has attained the eradication campaign against the black fly.

By comparison, during this same period there have been introduced into some of the new England States the Japanese beetle, European corn borer, oriental fruit motn and Asiatic beetle. These pests are now firmly established and are causing losses amounting to million of dollars annually.

One may be inclined to ask, if the State Plant Board's function is, among other things, to keep serious pests out of Florida, why citrus canker, Mediterranean fruit fly and black fly obtained entrance to the state. One answer is that human beings cannot be infallible. The instrumentalities which favor and even expedite entrance of insects and diseases into the United States are colossal and appalling. Every steamship cargo, every passenger from a foreign country and every airplane from foreign shores is a potential carrier of living insects and of disease infected plant material.

Another answer is that it is often impossible for the inspectors to detect the presence of well hidden plants or plant products which a few people, some of them well informed as to the need and reason for plant quarantines, at times attempt to smuggle into the country. One small piece of infected citrus budwood hidden in the traveler's clothing may be the means of reestablishing citrus canker in Florida, and one smuggled fruit may cause another fruit fly invasion. Then, too, there is the professional smuggler, who smuggles aliens, liquors, jewels, and narcotics. Smuggling boats bring in plants and fruits as well as articles more intrinsically valuable.

Against these perils the Plant Board inspectors wage a steady battle, day and night, year in and year out, inspecting planes, ships, baggage, freight and mail. A list of the insects and diseases which these inspectors have turned back at our ports would strike terror to any grower. The magnitude of their undertaking can be visualized when it is recalled that last year (July 1, 1936 to June 30, 1937) the Plant Board's quarantine inspectors, at Florida ports, inspected nearly 5,000 vessels from foreign shores. Of these, 1,610 were airplanes and 3,004 were boats. In all, 182,866 pieces of baggage and 5,076,432 units of plant material shipped from foreign countries came under inspection. It is a continuous battle against insidious and elusive enemies and like other battles and wars victory cannot always be on one side.

So far as citrus canker is concerned, it was firmly established in Florida before the State Plant Board was created by the legislature in 1915. How the Mediterranean fruit fly gained entrance to the state will probably never be known.

History repeats itself and will continue to do so. One does not know where the lightning will strike next. In 1926 there appeared in northwest Florida an insect which has come to be known as the white-fringed beetle. It is apparently a native of Argentina and cargoes of various materials have been shipped from the Argentine to Gulf ports. Nevertheless its method of entering the United States is problematical. The capabilities of this insect for damage are astounding and it menaces the mainstay farm crops of the southern states: corn, cotton, peanuts, chufas, sugar cane and velvet beans. Not enough is yet known about the white-fringed beetle to state definitely at this time if it will be possible to eradicate the pest or if economical control measures can be developed. Its distribution must be determined, its range of hosts, as well as its development, habits and characteristics must be studied. It is not impossible that as a result of this invasion a complete revision of southern agricultural practices may become necessary. This is cited as an example of the dangers to which we are exposed and to point out the necessity for guarding against the unknown as well as the known dangers. I will not take the time to burden you with details of this situation, as it is covered by Professor J. R. Watson's paper before this assembly.

The significant thing is that no crop and no section of the state of Florida can expect to be free from the danger of new and destructive pests. Protective measures to keep them out, as well as to attempt their eradication when they do get in, are just as important to the cotton, tobacco and truck growers as to the citrus growers, indirectly, of course, every business and industry in the state is equally concerned with the success of these efforts, for

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New Thoughts In Marketing . . .

Address Delivered By

James C. Morton

April 14, 1938, To Florida State Horticultural Society's Fifty-First Annual Meeting, Held In Winter Haven, Florida . . .

In 1877, the first carlot shipment of California oranges moved from a grove in the vicinity of Los Angeles to St. Louis. By 1885, shipments had increased to a thousand cars. In October of that year, because of "disastrous prices obtained," the Orange Growers Protective Union of Southern California was formed "to regulate the shipment of citrus fruit and distribute the same in such manner as to prevent overstocking of markets and thereby prevent such competition among the stockholders or their fruits as is prejudicial to their interests."

The topic assigned to me is "New Thoughts in Citrus Marketing," but that fifty-three-year-old California declaration of purpose shall be my theme, and to throw new light on its application to today's conditions in Florida, my aim.

Be it very definitely understood by all, that anything that I say is but the expression of my own, personal, opinion, and is not a reflection of the opinion of those with whom I am associated at Waverly, many of whom would, doubtless, differ with me as much as I expect the majority of you to do, and my purpose is to make my presentation of the subject as brief as possible in order that there may be ample time for those of you, who so desire, to express yourselves freely.

No general plan or single item of marketing procedure can be developed for Florida citrus fruit without carefully considering the varied avenues by which the Florida citrus grower chooses to send his fruit to market. Three groups of growers appear prominently in any discussion of marketing methods.

1. The grower who sells his fruit on the tree to the speculative buyer, who is frequently used by the industry as scapegoat upon which to lay the blame for its many sins of omission and commission. The speculative buyer can exist only as long as there are speculative growers.
2. The grower who ships and sells his fruits independently, receiving the price it brought in the market less fixed charges for services rendered, or receiving an agreed percentage of the net returns.
3. The grower who packs and markets his own fruit, either as an individual or in co-operation with other growers, sharing equally the burdens and benefits.

Each one of these three major groups of growers must have a reasonably equitable position in any broad proposal that affects marketing.

Large plantings here and in other areas, the progressive maturing of trees and improved scientific feeding and cultural methods, have created unprecedented and ever increasing volumes of fruit for which a profitable market can be found only through wider areas and extended periods of distribution or greater per capita consumption, or both.

Wider distribution is handicapped, first, by increasing costs of transportation, second, by diminishing returns as we cross the boundaries of marketing areas which are within more economical distribution range of other citrus-producing sections, third, by lack of tariff barriers to importation of Asiatic tangerines, fourth, by limitation of export opportunity through increasing foreign production of both oranges and grapefruit.

Per capita consumption is diversely affected: by national pay roll, total volume citrus fruit nationally produced, volume and consequent market price of competing fruit crops, reputation honestly won or deservedly lost because of quality, or its absence, in the product shipped.

The citrus industry is extremely fortunate in, and has been largely dependent for its success in the past on the increased consumption created by the health value of citrus fruit, so long and loudly proclaimed by both physicians and dentists, and every effort must be made by producers to carry the story of the medical profession into every home.

Wider distribution and increased consumption are being practically and profitably stimulated through the advertising funds created under State law, my only objection to which is that the amount expended, particularly on oranges, is too small to adequately do the job. However, the benefits of advertising will never be fully gained as long as the industry asininely permits fruit individually-stamped "Frozen Culls" to be shipped at all. This season, these went as far north as New England. Neither should the industry continue to ship the major portion of its volume in containers incapable of carrying it to market in reasonably sound condition.

To our detriment and disgrace, the axiom of yesterday, "Every doubtful orange is a cull," has been changed to "Every doubtful cull is a merchantable orange."

Many federal panaceas for agricultural problems have been attempted in the past decade and all, so far, have lacked success because of their failure to recognize man's insurmountable inability to accurately control agricultural supply to meet market demand.

The Agricultural Marketing Act of 1929 created the well-financed Federal Farm Board. One-half billion dollars to stabilize markets for agriculture! Its purpose was to stimulate the organization of national co-operatives to be fortified with credit at low interest rates, through which they might carry redundant supplies over a period of excess production or limited demand in order to await the return of a more favorable supply-and-demand condition. During the scant four years of the Board's existence, a preponderant part of its activities was devoted to the field of marketing, of which — despite ample financial and legal power — it made an outstanding failure.

The Federal Farm Board's third annual report, issued in December, 1932, contained the following comment:

"Experience with stabilization has demonstrated that no measure for improving the price of farm products, other than increasing the demand of consumers, can be effective over a period of years unless it provides a more definite control of production than has been achieved so far."

Perhaps the recent farm control enactment was conceived in this statement and given birth by the present administration's desire to boost the profits of agriculture and so, now, we have in many of the staple farm products federal dictation as to the number of acres that the individual farmer may plant, this in an effort to reduce production to within the limits of profitable demand. This effort to upset natural laws, like the Federal Farm Board program, I believe is doomed to failure.

In December of 1924, Mr. George N. Peek, who, since 1922, had been the chief proponent of a plan for bringing about improvement for agriculture, gave as his belief that there is no way to control or regulate production, and there would be no relief in it if this were possible, a general advisory role being all that should be attempted. In 1924, writing as president of the American Council of Agriculture to President Coolidge's Agricultural Conference, Mr. Peek said:

"It is unfortunate that many spokesmen for agriculture accept the view that the farmers' troubles come from overproduction . . . The existence of an exportable surplus of a vitally important food crop or commodity is not an evil, nor should the aim be to render it non-existent by acreage reduction . . . No human power can adjust acreage in crop or number of livestock so as to be cer-

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tain of having no surplus for export on the one hand, without inviting national underproduction, possibly famine, on the other . . . No human agency can adjust acreage or number of these great commodities and, except by accident, arrive at, or anywhere near, the desired mark in production. No human agency should attempt to. The one attempting it would be faced with the necessity of suggesting substitute crops to utilize the acres thus vacated. The difficulty of this is apparent. It is noteworthy that those ardent advocates who in 1923 would have turned the wheat farmers into commercial producers of butter fat, are now silent in the face of existing conditions in the dairy industry. Even if it were possible for farmers through voluntary organization to make a nice adjustment of acreage to the estimated domestic demand, there is no possible way of forecasting to what extent drouth and flood, hail and freeze, insects and disease — all these and others beyond the farmers' power to foresee and control — would thwart such calculations."

On May 12, 1933, the Agricultural Adjustment Act passed by Congress was approved, its effort being to stabilize marketing conditions through the adjustment of shipments to market demands in an anticipated better return to growers. The citrus industry of Florida, Texas and California immediately sought to take advantage of this Act and marketing agreements became effective in both Florida and California on December 14, 1933, and were followed by the license which became effective on December 19.

I need not further recite the series of marketing agreements and attempted marketing agreements which have followed, but say very definitely that after four years of intensive effort on the part of the best minds of the industry, we are forced to conclude that no marketing agreement can be written that will fit the peculiar conditions that exist in Florida. Discarding fancies and facing facts, my humble, but very definite, decision is that equity to the three groups of growers mentioned or provision for its assured continuation cannot be expressed in the cold, clear language required by law. It isn't possible to write any marketing agreement in the necessary legal phraseology to make it stand the strain of court attacks and at the same time be fair to all types of producers and shippers. No marketing agreement can be written with mathematical exactitude that will meet all conditions and variations, geographical, varietal and seasonal, that arise in Florida. So, I am fully convinced that further time spent in an attempt to develop another Florida Marketing Agreement is time futilely wasted, as long as conditions exist in Florida as they now are. Neither am I convinced, as many seem to be, that a marketing agreement will be found a panacea for all our problems. Presuming that we had in Florida the power to control volume and raise market values, what would be the result? It becomes increasingly apparent that, when any group has the power to control the price of the commodity it produces and sells, the tendency is to raise the price too high, the result of which is that high prices tend (1) to retard consumption and, (2) to increase production, both of which lead to the failure of the purposes for which the control was instituted. Again, if, through adequate control the price of our product is made higher in its relationship to competing products, then, too, consumption is immediately retarded and the purpose of the control again defeated. These dangers exist in voluntary programs and must be watched, but they can be disastrous under marketing agreements and licenses because the degree of control is greater.

Experience under the Agricultural Adjustment Act is too brief to appraise the results which will follow if the system is continued, and informed persons state that price enhancement resulting from the Cling Peach Agreement resulted in the unwholesome effect of planting of peach trees. Under a marketing agreement, asparagus planting threatened to be overdone until prices of competing groups sharply checked asparagus acreage. The favorable prices for Florida celery obtained in the 1934-1935 season were not due to a marketing agreement so much as to a year when competition of other celery-producing areas was very low and the plight of the celery grower today clearly shows that his problem has not and, I believe, cannot be solved by federal control.

Orderly distribution has its value, but can never overcome the price-depressing effects of large volume fighting for a place in a market handicapped by low purchasing power, and those who earnestly believe that a marketing agreement will, in some miraculous manner, add fifty cents to the value of every box of fruit shipped, are headed for the mire of disappointment in pursuit of a will-o-the-wisp as dangerous as that that lured the farmer during the existence of the Federal Farm Board.

Now I do not mean to imply that the Florida industry could not be greatly benefited by more orderly distribution of its fruit, both as to time and place, because the value of this has been demonstrated, but a successful program of this character cannot be written in a federal marketing agreement — as has been proved in the last five years. Such a program must grow out of cooperation within the industry, itself.

In 1927, at a growers' meeting held during the Orange Festival in Winter Haven, this same problem was up for discussion and a group of earnest growers were instructed to give the matter study and find its solution. These men worked earnestly and at a meeting of this Horticultural Society, held in this city, their plan was first presented. The plan was put into operation the following season and very speedily demonstrated its elasticity to meet all Florida's requirements, its practical value in methodically aiding the distribution problem, its cooperative value in creating harmony and cooperation within the industry. That plan— I don't care from what angle you view the problem — is still the only solution to Florida's growing distribution question.

Our problems will never be solved by school-boy economists who know nothing of them, but will only meet practical solution by hard work, earnest effort and enthusiastic willingness to cooperate on the part of the industry, itself. I am not at all eager to see the citrus industry of Florida do as other agricultural groups have done, Esau-like, sell their birthright of liberty and independence for a mess of federal pottage. Florida's solution lies, not in Washington, but in the hands of you men who produce our citrus crop and who have the capacity and courage to meet its problems, or invite the aid of those who CAN. The need of the Florida citrus industry is not menacing and questionable federal control, but sincere cooperation within the industry, itself.

Please keep this firmly in mind: a number of consecutive prosperous years would ruin our industry. Spells of low prices are a necessary, valuable and really profitable restraint on every agricultural and industrial pursuit. An easy, assured, abundant annual income from citrus production would speedily destroy itself because in a few years every available citrus acre in the four producing states would be planted out. Quit whining! Men and nations thrive on hard knocks and remember, Florida Growers must learn (perhaps through bitter experience) to subordinate individual interest to common good. The key word is **COOPERATION.**

Such cooperation existed and successfully operated following the establishment of the Clearing House in 1927 and it would be difficult to estimate the tremendous amount of good that accrued to Florida citrus growers through the weekly gatherings, frank discussion and exchange of information among those who were engaged in marketing. Informed analysis and exchange of opinion on market trends and the various factors that affect price expectation and market demand, together with study of market values and the probabilities of their rise or fall, all had a wholesome, enlightening effect that was profitable in dollars and cents.

Florida's greatest marketing need today is, cooperation. We need the weekly discussion of those very pertinent points of sales and distribution policy, together with the steady, confidential exchange of price information and the regular dissemination of all factual and statistical data having a bearing upon citrus market values. True, such voluntary acquiescence to a general plan had its difficulties and serious problems, but these were small when compared to the almost insuperable handicaps that may emanate from a not-improbable future federal control of every citrus grove.

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A GREAT MEETING

The fifty-first annual meeting of the Florida State Horticultural Society recently held in Winter Haven was one of the very best held in recent years, both in point of attendance and interest.

From the time the first session opened until the final fall of the gavel the Civic Center building was filled to overflowing with an attentive and enthusiastic crowd of growers. Only the meeting held in Ocala a year ago in celebration of the fiftieth anniversary of the founding of the Society equalled it in attendance in any recent year.

Topics covering every phase of citrus culture, fertilization, spraying, irrigation, soil analysis and marketing were handled by specialists in each line and by growers prominent in the industry.

The success of the meeting was highly gratifying to the officers and committees who had labored hard and earnestly to bring about that success and to them is due the thanks and congratulations of the industry.

At the close of the sessions Hollywood was chosen as the place of meeting next year and the following officers were named: President C. I. Brooks of Miami; vice-presidents, T. Ralph Robinson of Orlando, H. C. Henrickson of Eustis, F. M. O'Byrne of Lake Wales; secretary, Bayard F. Floyd of Davenport; treasurer Frank L. Holland of Winter Haven.

The Florida State Horticultural Society during its fifty-one years of life has done much for the citrus industry of the state and it is encouraging to the officers who have devoted so much time and thought to its activities that the growers of the state are taking such a deep interest in its continued success, as demonstrated by exceptional attendance and sustained interest at the Winter Haven meeting.

READ AND PRESERVE

The Citrus Industry in this issue is presenting a number of the interesting and important papers read at the fifty-first annual meeting of the Florida State Horticultural Society at Winter Haven. In future issues of the magazine others of these papers will be presented until all have been printed.

Every paper read at the meeting was of manifest interest to growers, some of very vital interest, and it is with the thought that many growers desire to have these papers available for ready reference that this publication is presenting them to its readers.

Every one of them is worthy of presentation and we believe that they will form an important addition to every grower's citrus library.

DROUTH AFFECTS MANY GROVES

The exceptional drouth from which major sections of the Florida citrus belt has suffered this season has materially affected many groves, in many instances causing heavy droppage of fruit.

Growers who are equipped with irrigation systems have been applying water and many new systems have been installed. Where irrigation was impossible many groves have suffered severely.

On the Lower East Coast, in the Miami and Homestead sections, the droppage caused by the drouth is said to have been extremely heavy, both of mature fruit still held on the trees in hope of better prices, and of the newly formed fruit from the early bloom. Unless rains come soon this droppage will doubtless continue where irrigation is not provided.

But Florida is not alone in this respect. A letter recently received by the editor of this magazine from Juan Ulacia, an extensive citrus grower of Torriente, Cuba, says:

"Drouth has been so severe this year that it can be said that we have not had even symptoms of rain since October 1937. We have been irrigating continuously since that date, and I suppose we will have to keep on until at least the early part of June, when the rainy season is due to start."

GROWERS INTERESTED

The series of meetings being held throughout the citrus sections of the state by the State Agricultural Extension Service are being well attended by growers.

Production and marketing problems are being discussed and analyzed by speakers of statewide reputation, who point out that increasing production in this and other citrus producing states has created a situation which calls for better knowledge of and greater attention to both the production and marketing problems of the grower. It is in the hope of aiding growers to solve these problems, in a measure at least, that these meetings are being held, and the attendance and interest shown in the discussions is evidence that the growers are awake to the situation.

With citrus production increasing, not only in the United States but throughout the world, it behooves the citrus grower to produce and market only the very highest type of fruit — the kind which always finds a market at a profitable price.

Spray for Quantity as well as Quality!

and cut spray costs by "ORTHEXING" your sprays

● "ORTHEXING" a spray mixture is simple . . . just add "ORTHEX" Spreader-Adhesive. It cuts the cost by reducing run-off of valuable material. It improves control by providing a better tighter-sticking coverage. Wind, rain, and limb brushing do not remove the protective spray coating.

Use "ORTHEX" with all Copper and Sulphur Sprays. In combination with COPOSIL Fungicide and similar insoluble Copper Sprays it has definitely increased fungicidal effectiveness . . . When added to most forms of Wettable Sulphur, "ORTHEX" assists in building a heavy uniform film deposit.

If you want to cut your spraying costs, improve the quality of your fruit, and step up production, write for full information on "ORTHEX," the unique Spreader-Adhesive.

For Scale, White Flies, Mealybugs, Spotted Mites
SPRAY WITH "VOLCK" OIL SPRAYS

● They have proven exceptionally safe to tree and fruit (including fruit coloration) and highly effective in controlling the pests. VOLCK Oil Sprays represent the most important development in citrus insect pest control in years. They were the first Oil Sprays of the phytonomic type, perfected for commercial use, one of the outstanding contributions of California Spray-Chemical Corporation to the onward march of pest control.

Growers who have consistently used these sprays have had conspicuous success in quantity production of fine quality fruit.

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Soils - Testing

Interpreting Soil Tests

PAPER DELIVERED AT 51ST ANNUAL MEETING OF FLORIDA STATE HORTICULTURAL SOCIETY

: BY :

Major Edward Keenan

Dr. Glenn Frank, formerly president of the University of Wisconsin, said:

"The future of America is in the hands of two men — the investigator and the interpreter. There is a shortage of readable and responsible interpreters, men who can effectively play mediator between specialist and layman . . . Science owes its effective ministry as much to the interpretative mind as to the creative mind . . . Rarely do the genius for exploration and the genius for exposition meet in the same mind. The investigator advances. The interpreter advances progress . . . A dozen fields of thought are today congested with knowledge that the physical and social sciences have unearthed, and the whole tone and temper of American life can be lifted by putting this knowledge into general circulation. But where are the interpreters with the training and the willingness to think their way through this knowledge and translate it into the language of the street? I raise the recruiting trumpet for the interpreters." (unquote).

At the opening of the school of medicine of Columbia University last September, Dr. Nolan D. C Lewis, addressed the 200 incoming students as follows:

"Sometimes I think men are needed who can arrange in synthesis the facts already discovered more than we need new facts." (unquote)

The subject assigned to me is "The Interpretation of Soil Tests."

Before we can interpret a soil test we must understand the fundamentals of soil chemistry. This branch of chemistry differs from analytical chemistry as one branch of mechanics differs from another. Soil testing differs from soil analysis. Soil analysis is a measurement of the total ingredients of a soil, while soil testing is a study (for our purpose) of the adaptability of a soil for agriculture. The interpretation of a soil test involves a consideration of soil chemistry, soil physics and soil bacteriology.

As agriculturists have discovered soil testing has changed the whole conception of plant feeding because it set us right on many misconceptions. As Dr. Connor, of Purdue University, said in his paper before the American Society of Agronomy:

"As a result of our tests, it was concluded that instead of the field plot soil test being a good check on the accuracy of the rapid method of testing, the reverse was true and the rapid test could be used as a check on the condition of the experiment fields." (unquote).

Before interpreting soil test data, we must realize that our test can be no better than the soil sample. A test of a handful of soil taken at random is almost valueless. A fair sample of a citrus surface soil is a mixture of soil taken from at least 20 spots to the depth of the feeder roots. For citrus, the subsoil conditions may be even more important in fertilizer recommendations than is the surface soil.

Obviously the whole subject of soil test interpretations cannot be covered here, so only some of the high spots will be considered.

Now, let you and me picture a plant living on a certain fertile soil. As that plant grows and develops, it removes certain elements from that soil. When a certain portion of each element is removed, we can understand that it becomes increasingly more difficult for the plant to extract more. The elements are being depleted. At some point along the line, that soil will become only partly fertile, but it may be clean, healthy, etc., only needing renewal of certain ingredients. How to renew the elements is one of our problems.

Suppose we grow two different kinds of plants on the same soil. Suppose each plant has different feeding requirements, as far as amounts and rate of removable plant foods are required for its development. Then each plot of soil though similar to begin with, will reach its non-fertile state at a different time. One plant, like spinach, may require a large amount of nitrogen. Another plant, like beets, may require a larger proportion of phosphate.

Now, it is easy for us to conceive that a plant whose life is only 60 to 90 days must obtain all its nutrients in a relatively short time. Therefore, this plant must have a large proportion of its nutrients in the quickly available or water extractable form.

You know, a citrus tree is drawings its plant food over the greatest portion of the year, so even though requiring a great deal more total nutrients than the small quick growing plant, it can get along very nicely on a more slowly available source.

As an analogy Prof. Troug offers our money situation: "We have certain loose change in our pocket; it is readily available. We can drop into the cigar store and readily buy a cigar. We have a checking account in the bank which is very satisfactory for the purchase of a suit of clothes. It is available, but not so readily available as the loose change in our pocket. Then we have some stock and bonds or other securities that would be slowly available but perfectly satisfactory for the purchase of a house or an automobile." (unquote).

There are many soil conditions affecting the availability of nutrients and the ability of a plant to absorb the nutrients. In testing a soil sample, one of the first considerations will be to learn the pH, that is, whether it is acid or alkaline and to what extent. One of the reasons for this test is that plants have difficulty in absorbing different nutrients at different pH values. At high pH values, or in the presence of residually alkaline fertilizers in alkaline soils, the plant has difficulty in absorbing sufficient nitrates, and phosphates, while at low pH and in the presence of residually acid fertilizers on acid soils, the plant will have difficulty in absorbing calcium, potassium and magnesium, (postive charges ions called cations.)

For the above reasons most plants grow best in nearly neutral soils. But even at that, plants will absorb very little phosphates at below pH 6 or above pH 7.5. This is not far from neutral. On the other hand, plants will have difficulty in obtaining sufficient manganese when the pH is above 6. Then again, if manganese is present in a soil below 5 pH, it is probably toxic.

When a fertilizer material is applied to a soil it will release certain amounts of some soil ingredients, different in composition from that which was applied. But this release becomes more difficult year after year as the more easily released compounds are affected.

It is very doubtful if any fertilizer material which we add to a fertile soil acts directly as a plant food. Its effect is primarily upon some other soil ingredient. As an example, potash added to a soil containing calcium, as limestone, will release the calcium. The calcium sulfate content of superphosphate will release magnesium from magnesium soil comcompounds. Hence to interpret a soil test, we must know what results we are after and what will result from the addition of any material.

Soda added to a soil that contained much calcium clay, will release calcium and will form a soda-clay. As you know, this clay is sticky and affects the waterholding characteristics. It will be very favorable in sandy soils with little clay or unfavorable with silt soil of much clay content.

Ratio and Proportion

It has been found in field and pot tests that the amount of nitrogen which caused severe injury to tomatoes where the potash was at a certain level, did not cause injury when the amount of available potash was raised. In this case it could be considered that injury caused by a large application of nitrogen in the presence of a small amount of potash, might be classified as due to an excess of nitrogen instead of a de-

ficiency of potash. In fact, the symptoms are quite similar, so whether or not a certain amount of nitrogen is correct, depends, in this case on the amount of available potash we have.

The suitable nitrogen-potassium ratio for tomatoes in sand cultures, has been found to be 2 to 1 when the amount of potassium is adequate, but this cannot be construed to mean that if the potassium was excessive and tests showed that the ratio was 1 to 1, that changing the ratio to 2 to 1 by increasing the nitrogen, would be correct.

Hence we realize the relation of one element to another is vitally important. The relation of aluminum to potassium may be taken for another example. Under certain conditions, for instance, when calcium and magnesium are low, potassium is so very readily absorbed by plants as to become injurious to the plant cell, but this effect may be largely counteracted by aluminum. In which case, neither the aluminum nor the potassium could monopolize cell structure, hence the two elements would counteract one another.

Data shows that the amount of potassium absorbed by a quick growing plant is quite consistent up to a concentration in the soil of about 100 parts per million of soluble or replaceable (available) potassium. After this point is reached, the rate of absorption falls quite sharply. This is, of course, contingent upon the supply of available potassium being kept constant by the maintenance of slowly available potassium sufficient to maintain equilibrim (saturation) with the soil solution, and other conditions satisfactory.

The relation between boron and calcium, sodium and magnesium, potassium and manganese, carbon and nitrogen, could also be cited if time would permit.

Base Exchange

Dr. Peech, soil chemist of our citrus experiment station, presented an excellent paper last year before this Society on this subject of base exchange. Dr. Peech emphasized the importance of Base Exchange to us Florida growers by selecting this subject as his first public paper to present in the state. Inasmuch as he covered the explanation of Base Exchange so thoroughly, I will not go into the detail, but refer you to last year's proceedings of this Society. As you probably know, Base Exchange is a phenomena wherein the soil will absorb one element from a compound we apply in exchange for some other element that was already in the soil, thus releasing it for plant use. It is this exchange of base elements that largely accounts for their being available as plant foods.

Soils differ in their capacity to exchange bases and all soils have a limited capacity, hence, differ in their capacity to supply plant foods. Experiments have shown that after adding to a soil a solution containing a certain amount of any one of the bases, such as sodium, potassium, magnesium, or calcium, the exchange will eventually cease, and our original solution will leach away unaltered.

We could have further noticed that the less concentrated the applications, the greater the percentage of base the soil was able to absorb, but a less total. That is, a small application gave up a higher percentage to the soil than did a heavy application. You can see the importance of this feature in practical fertilizer applications. Your soil test data can show you how much of any fertilizer material it is economically practical to apply at one time.

There will also be considerable difference in the amount of a substance absorbed by a soil from a solution, containing different substances in the solution. Thus, certain soils will absorb and hold twice as much ammonia from a solution of ammonium phosphate as from ammonium sulphate, twice as much potassium from potassium phosphate as from potassium chloride.

Thus we learn the old rule, "Different soils exert absorption power toward the same substance to an unequal extent and different order."

When we add different combinations of fertilizer materials to our soils, we alter to a considerable extent the order of which the bases exchanged with one another. In interpreting your soil test data, you consider the predominating base present in your soil before you can decide on the amount of another base to add.

Then there is the matter of carry-over. It makes no difference what compounds we have been using in the past, there is always a carry-over of some compounds which alter the base-exchange characteristics. Soil tests show that what these carry-overs are and how tightly they are held, and what will unlock them. You should not add Calcium Lime to soil deficient in Magnesium, because you would exaggerate the Magnesium deficiency.

As you probably know, calcium is, or should be, the principal base-exchange compound in the soil. In soils containing large amounts of calcium, for example, limestone, and only small amounts of other bases, very little calcium would be available for our plants, because limestone is only slightly soluble unless attracted by an acid or a solution containing another salt. If we add more lime or a soluble calcium compound such as superphosphate, we would still have only very little available calcium, for the reason that Calcium is still the principal base. But if we add another salt, for example, muriate of potash, to this soil, the potassium would exchange with the calcium with the consequences of our Lime furnishing available Calcium.

In this case, the improved results that we would see in the plant would most apt be due to the calcium that was made available, and not to the potassium. In other words, the potassium being only indirectly responsible for the betterment in our tree condition and fruit quality.

From the above, you and I can see something of what we cause to occur in our soils when we add one or more fertilizer materials. Thus a soil containing a high amount of lime will retain and require more potash or other bases than would a soil low in lime.

On the other hand, you can also see how excessive applications of potash, soda or magnesia might deplete the calcium content of some soils. If the soil test showed that the total calcium content of the soil was low, you would add only a small amount of potash, because a slight excess of potash might put your plants at a great disadvantage. Again, a large application of calcium could lock up too much of our potash and magnesia.

With nitrates and phosphates, the situation is different because base-exchange has nothing directly to do with those two compounds, but the addition of either can change the whole soil complex.

Thus, we must all know what is present in a soil before we can successfully add some other element.

Now when you come to interpreting phosphorus tests, you will find it is very important to know what form of phosphorus has been formerly applied to the soil. If not known, then it is quite essential that your phosphorus tests include several forms of phosphate. You know, some rapid test methods, the LaMotte, for example, will detect phosphorus from raw ground phosphate rock entirely too easily for citrus culture, though very satisfactory for cow peas.

The amount of phosphorus extracted from different soils by the same extracting solution varies considerably. Some extracting solutions for phosphorus are quite reliable on acid clay and loam soils, but tend to show too high availability on neutral or alkaline soils or one light-colored sand soils and subsoils, and too low on organic soils. Hence, you select the proper extracting solution for each soil.

When phosphorus, in any form, is added to a soil, there are new and other forms of phosphorus formed: for example, there will be mono, di, and tri, calcium phosphate, along with iron and aluminum phosphate, and phosphatic colloidal compounds, all having different degrees of availability. The presence of these influence the ionization and solubility of still other soil compounds. This must all be taken into consideration in making any interpretations.

All methods of soil testing must be calibrated against each different soil type. You can illustrate this by repeated leaching of the same soil sample, by the same form of leaching solution, and you will find that the second, third or fourth leaching will often remove even more phosphorus than the first leaching. This is also true of other soil elements. So if you leach 10 grams of soil with 20 cc of leaching solution, you must know how much of the total of each element that the soil contained is removed by your 1 to 2 leaching ratio. For phosphorus, this may be only 10 per cent or it may be 50 per cent, but we must know how much of the total contained in each different type

of soil was leached out by a 1 to 2 single extraction.

Phosphate tests are among the most complicated to interpret and most difficult to conduct.

In making fertilizer recommendations from soil test data, one should be influenced by the expected cultivation program. For example, it has been shown that the growing of one cover crop can release for plant use as much phosphorus as contained in 100 pounds of superphosphate, and as much potassium as contained in 200 pounds of muriate of potash. Hence, the interpretation of test data for a citrus grove, when clean cultivation is practised, will not fit when a good cover crop is grown.

Soil test data is especially valuable in anticipating future plant behavior while an analysis of the plant ash or plant appearance may throw light on past soil conditions, hence soil tests should go hand in hand with plant analysis.

Soil test data must be tied in with plant absorption knowledge before fertilizer recommendations can be made. For example, soda added to a soil containing lime will probably increase the available calcium from that lime. But soda depresses the absorption of magnesium by the plant, so, while a soda application may favorably affect the calcium situation, it may have an adverse effect upon the plant by hindering the plant from absorbing the required magnesium.

This brings us to the consideration of the moisture condition. That the degree of soil moisture has an affect upon the degree of certain deficiencies within the plant, has been definitely established, and the absorption of the elements by the plant is in close relation to the absorption of moisture. No interpretation of soil test data is possible without consideration of this matter.

To illustrate: It has been shown that some of the constituents of plant ash are taken up in increasing quantities as the water requirement of the plant is satisfied. This is particularly striking in the case of calcium. In other words, calcium is most readily absorbed by the plant from moist soil.

The up-take of potassium, phosphorus, and magnesia in relation to moisture, follows the same rule, but is not quite so consistent. In some cases, even in the presence of an ample moisture supply, due in part to the calcium, plants grown on moist soil contain relatively less potassium, phosphorus and magnesium than do plant on relatively dry soil. In this case, calcium, in the presence of ample moisture, will depress absorption of the other elements. Hence, in interpreting soil tests, the moisture conditions must be anticipated.

While ample moisture conditions favor the elements just mentioned, the degree of Manganese absorption in plants will be less on wet soils than on dry soils. It is sometimes noticed that Manganese deficiency appearing in plants, persists even when it is known that ample Manganese is present in the soil. It is then further noted that these symptoms disappear in the new growth when the soil dries out. The appearance of the plant under these conditions is not exactly unlike that indicating Magnesium deficiency, and this emphasizes the uncertainty of a diagnosis based on observation of symptoms.

Cameron & Barkley Advertising Has Far Reaching Results

Glenn B. Jennings, manager of The Cameron & Barkley Company, expresses the sentiment that The Citrus Industry offers its advertisers plenty of "pulling power."

Mr. Gennings' company has been a consistent advertiser in this publication for many years and has had substantial evidence of the effectiveness of Citrus Industry advertising, but for long distance effect the following letter which he credits to the power of our advertising just about wins the long-distance award.

The letter from a Citrus Industry subscriber follows:

Protectorat
De La Republicue Francaise
Au Maroc
Government Cherifien
Direction Des Affaires Economics

Casa Blanca, March8, 1938

To The Cameron & Barkley Company
Tampa, Florida.

Dear Sirs:

Will you have the kindness to send me as soon as you can, catalogue and prices of your citrus packing equipment.

With all my thanks, believe me, sirs,

Yours very truly,
H. BRAYARD

My Address:
H. Brayard, Inspection Regional de la Horticulture,
57 Boulevard Pasteur,
Casa Blanca, (Morrocco)
North Africa.

A notation at the bottom of the letter states that the writer saw the Cameron & Barkley adverisement in The Citrus Industry.

Cuttings of the ornamental bush, turk's cap or malvaviscus, can be made at almost any time of the year, says the Florida Experiment Station. The cuttings should be from 6 to 8 inches long, and should include nodes at each end. For rooting, about three-fourths of the wood is inserted in soil, and kept moist.

How New Freight Rates Affect Citrus

In publishing the bulletin of the Growers and Shippers League of Florida in last month's issue, showing the changes to various points by the new rates, some of the figures were transposed. The table of rates and changes as it should have been is printed below:

From Lake Wales, an average rated origin point to the auction markets, the changes will be as follows:

Rates in Cents per 100 Pounds and Cents Per Standard Box

	Present Going Rates		Increased Rate effective 3-28-38	
From Lake wales Fla. TO	Cents Cwt.	Cents Box	Cents Cwt.	Cents Box
New York	66.5	59.9	70	63
Philadelphia	66.6	59.9	70	63
Baltimore	72.3	65.1	76	68.4
Boston	78.5	70.7	82	73.8
Pittsburgh	88	79.2	92	82.8
Buffalo	96	86.4	101	90.9
Cleveland	90	81	95	85.5
Detroit	91	81.9	96	86.4
Chicago	90	81	95	85.5
St. Louis	83	74.7	87	78.3
Cincinnati	76	68.4	80	72

Even at a bathing beach, men like to have **something** left to the imagination.

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Geo. L. Simonds Co., Winter Haven, Fla., will be pleased to serve you.

CITRUS PRACTICES IN THE INDIAN RIVER SECTION

(Continued from page 3)

build small mounds for the trees. The water furrows formed by this method of plowing furnishes drainage during the rainy season and allows us to use the open furrow system for irrigation during the dry season. As most drainage districts are designed to carry off the average rainfall and not the flood rains we have found in actual practise that it is advisable to have a system of dikes and pumps. The groves in the major part of our drainage district are equipped with pumps and control gates which allow the owner to pump the excess water off in flood times.

The pumps generally used are one designed by Couch at Grant, Florida, and one designed and manufactured by Leonard Gollnick at Vero Beach. Over a period of years the pumps have proven to be very efficient, economical and satisfactory.

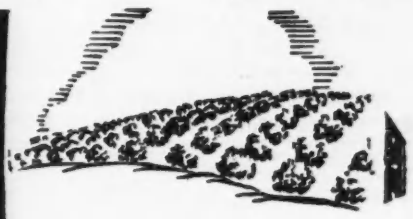
I thought it would interesting to take a specifie grove and give everything incident to the production of a citrus crop on that grove for a period of one year, together with the cost, time of application of fertilizers and sprays and also the age of the grove, yield per acre, the cost per box, the selling price and the net return. This grove is in a drainage district.

I have a caretaking organization set up to care for grove properties. We say we are prepared to select land for you, clear it, set it to trees, care for the grove, pick the fruit, pack it and ship it for your account.

We have about eight hundred acres of grove properties under our care and management and the property on which I am going to give you the cultural practices is one of these properties where our operating company does all the work.

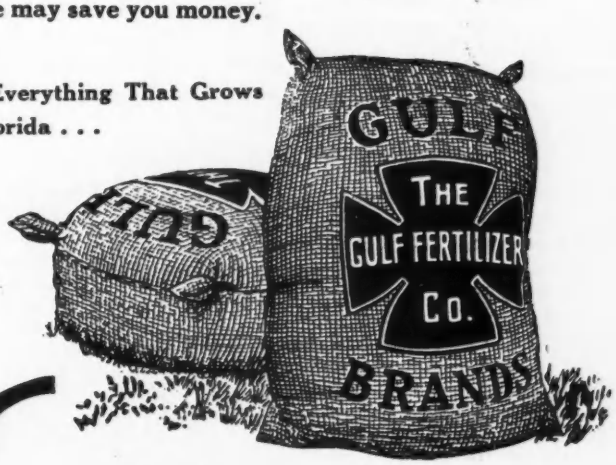
This particular tract of land is a forty-two acre grove which was set in February 1927, and the year I have selected is the year covering the fruit crop of 1934-35. The type of soil is dark sandy loam underlaid with shell and marl. In some instances there are only three or four inches of top soil on the marl and it has a pH reading of eight and above. In the sandy loam and muck areas of the grove the pH reading at the beginning of the planting was as low as four. The trees are set on mounds and the beds are thirty-five feet wide. The trees are set twenty feet apart in the row. In this grove

(Continued on page 19)



HEED the experience of successful growers throughout Florida—use QUALITY fertilizer for your grove every time you make an application. Trees need complete, balanced fertilizer to produce quality fruit and maintain vigorous growth and health. GULF BRANDS of FERTILIZER, because they are "keyed to the soil" for various sections of Florida, and because they are made from high-grade, well-ripened materials, prove more economical in the long run. Let the Gulf Field Man in your section, who knows local conditions, suggest an economical fertilization program for you this year. He may save you money.

For Everything That Grows in Florida . . .



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36th Street, South of East Broadway, Tampa, Florida

VALUE OF "LIVE-AT-HOME" PRACTICES FOR CITRUS GROWERS

(Continued from page 5)

fresh and canned, is an item of increasing importance and promotes thrift and economy in the home.

Home agents realize the great need for all-year gardens, increased plantings of fruit trees and berries. They continue earnest efforts to interest club members and others concerned with the welfare of rural Florida in extending the calendar orchard and year-round home garden demonstrations to every farm home wherever conditions are suitable. Records submitted for 1937 showed 3,039 year-round gardens in 35 of 67 counties with a cash valuation of $23,351.32 for vegetables sold therefrom.

Florida soil is cordial to more fruits than any other state in the Union, according to some authorities. Nevertheless, hundreds of homes have no fruit or, at the best, there is a great lack of variety. In the northern and central counties such fruits as the pear, the peach, the persimmon, the fig, the muscadine, grow with very little encouragement. In south Florida may be produced a glorious variety of citrus fruits, the luxurious mangos, avocados and papayas and many other valuable foods, likewise with little effort.

This encouraging report on fruit plantings comes from the lower east coast, Palm Beach County. Mrs. Edith Barrus, home demonstration agent, says: "New calendar orchards were established in 50 homes while 55 women reported planting 543 fruit trees, especially mangos, limes, lemons, guavas, banana, avocado and the smaller fruits, as carissa and surinams, strawberries, and pineapples. Five thousand, five hundred forty-seven pounds of fruit were sold.

"Tours to fruit orchards were made during the Home Improvement Tours in each section.

"There have been 65,253 berry plants and vines planted."

Conserving The Foods

Budgeting the canned food needs and canning the budget, in addition to a surplus in many cases for marketing and barter, is a project of great satisfaction and of progress. However, it is still necessary to urge many housewives to make out a budget of the food needs of their families for the year, the fresh vegetables they will require, the canned and preserved fruits and vegetables that will be necessary. The following table shows the summarized results in food conservation for the year 1937:

Number of homes canning according to needs of a family budget	2,231
Number of quarts of:	
Fruit canned	247,707
Vegetables canned	782,693
Pickles made	56,535
Relishes made	36,268
Marmalades made	42,200½
Preserves made	56,734
Jellies made	62,147
Number of gallons of vinegar made	1,693½
Number of gallons of fruit juices canned	10,184½
Number of quarts of meats:	
Pork canned	53,820
Beef canned	58,143
Game canned	328
Fish canned	3,282
Poultry canned	8,564
Number of families that cured meats	2,426
Pounds cured	334,071
Number of families that made sausage	2,250
Pounds made	66,071
Number of families that made lard	2,419
Pounds made	140,008
Number of families that made soap	889
Pounds made	18,114

Mrs. Elizabeth Moore of Citrus County, evaluates the home canned goods as follows: "Two hundred eighty club members assisted others to the extent of canning 204,818 containers of fruits, vegetables and meats which, if valued at the lowest chain store figures, totals $32,514.-30. This canning was done almost entirely by people on the farms of the county. If the values were in terms of cash and appropriated to the farms of the county, it would mean $116 per family.

"The one big aim in the canning program is to serve the family balanced meals 365 days each year. This can be done when the family, the hen, the cow and the sow contribute their part. Now that canning is being done we are studying scores in order that the quality of all kinds of canned goods be better."

Contests Awaken Interest

In 1936, 871 women qualified in the "three jar can for quality" contest, with a total entry of 2,613 uniform containers. Last year the number of participants was increased to 1,452, totalling 4,356 uniform containers. The purpose of this contest was: first, to make the home canner more quality conscious; second, to establish higher standards of workmanship; third, to bring about knowledge of grades and standards; and fourth, to encourage planning of better balanced meals for farm families through the thoughtful development of menus formulated around the three jars.

From a tourist county on the east coast where rural people live in small towns on small lots, mainly a wide awake, progressive population, the council set as its objective the maximum participation of 250 women in the Three-Jar Contest, a brave undertaking in a comparatively new county in home demonstration work. We agree with the agent that it was a magnificent attainment to have secured the participation of 206 women.

Mrs. Eunice Gay, the Brevard agent, tells her own story and says: "A big accomplishment this year was to get 206 women to enter the Three-Jar Contest with a jar of fruit, a vegetable and a meat together with menu using these in a meal. In order to have three fine jars a woman was forced to can several of each thing from which to select her entries.

"She was also forced to learn something about canning before she could get nice jars and then she naturally used the other ones which she had canned and so found out how handy it was to have a jar to open

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in an emergency. She was forced to think about ways of serving canned foods.

"If she had never canned before, this contest gave her a start in the right direction and we hope it may be the means of starting her on a planned canning program. Then she would begin to think of planting more to have to can and the desired cycle would begin."

Management of county kitchens is described by Mrs.Marguerite Norton, Volusia county agent, thusly: "Plants are operated under the direction of the home agent and the supervisors are all home demonstration women. The five working this year canned 18,016 cans, whereas last year the number was 9,581.

"The county toll was 8,592 cans this year and 3,783 cans last year. The amount paid out for supervision was $226. Other expenses brought the total of the five plants to $930.-27 and this included cans, kerosene and repairs.

"In addition to this the women have canned 20,002 quarts in their own homes and have sold canned goods to the amount of $150. Pressure cookers bought by individuals numbered 32, and 45 were purchased last year."

Girls Canning And Gardening

Girls enrolling in gardening numbered 4,994. Out of this number were 3,397 completions. This girls' program is a miniature of that for the women. As the girls become efficient in the demonstrations outlined and have completed the work required in the demonstrations, they are "graduated" therefrom or as they become old enough to adapt themselves to adult conditions and adult society they automatically become a part of the women's program.

Club girls enrolled in canning during the current year aggregated 3,397 who reported 73,085 quarts of fruits, vegetables and meats canned and 23,867 containers of jellies and preserves. The canning demonstrations required for girls are outlined for four to five consecutive years of work. A girl may complete these demonstrations in less time if the variety of products is available and her ability to do will permit. These requirements are set up with the thought and expectation of the club girl eventually concerning herself with the budgeted food supply for the family.

Girls' canning contests as carried on in past years were continued without change in 1937, terminating with the required exhibits and records at Annual State Short Course in June. The younger club girls, to be eligible to enter the contests, must comply with the requirements of their particular year's demonstration. The older girls, to participate must also have finished the requirements of the third year's canning demonstration.

The five girls scoring highest at State Short Course are given the opportunity to add to their results during the summer and resubmit records and exhibits in October, when the winner is determined for the trip to the National Club Congress. The club girl winning the trip to Club Congress this year was Almena Rogers, an enthusiastic, ambitious, rural girl. Almena had to her credit, at the age of 15, the completion of 25 projects, six in gardening, five in canning, six in poultry, six in clothing and two in food preparation.

During her five years of club work she has canned 3,453 quarts of berries, tomatoes, pears, peaches, soup mixtures, peas, beans, meats, relishes and marmalades. During this same time she has won $24.32 on work exhibited, and has a total sales return on her projects of $1,251.57. In addition, last summer, Almena canned 14 cases of vegetable products and sold them for $64.01.

Citrus and Honey Exhibits

Fourth competitive, educational exhibit of citrus by-products — canned grapefruit, marmalades, preserves, sweet spiced pickles, crystallized citrous of commerce and other candied citrus fruits and baked products —featuring the uses of citrus fruits in many delectable ways, was again set up at the Florida Orange Festival in Winter Haven, located in the center of the citrus industry. Seventeen agents working in citrus producing areas cooperated. This beautiful display, featuring a wide selection of Florida citrus fruits in all their various culinary possibilities, did much to bring about an appreciation of their many healthful and delightful uses.

Florida honies, many of them, are distinctive of the state. Mangrove, for instance, may be obtained only from the sub-tropical coast section. Tupelo, palmetto, gallberry and other many interesting types are found only in limited sections of the southernmost of southern states. Orange blossom honey is considered one of the choicest and the demand always exceeds the supply.

The use of honey in the home and in general cookery is growing slow-

(Continued on page 21)

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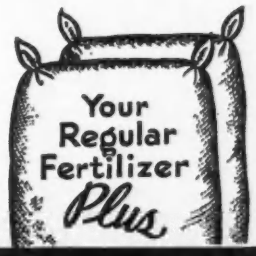

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Citrus Fruit, marketing

Growers Study Production And Marketing Problems

Florida citrus growers were given an opportunity to learn first-hand facts surrounding their production and marketing problems through a series of meetings now nearing completion conducted by the State Agricultural Extension Service.

At 29 meetings throughout the citrus belt from April 20 to May 6, representatives of the extension service and the State Experiment Station explained and discussed with growers the situation in the citrus industry and the prospects for the future.

Most of the problems facing the citrus industry are due to the sharp increases in production of oranges and grapefruit during the last few years. Growers and shippers have been forced by the greater quantity of fruit to expand their market outlets and make more strenuous efforts toward improving marketing conditions.

The trends in citrus production and prices, and Florida's place in the citrus industry were discussed at the meetings by D. E. Timmons of the State Extension Service staff, and W. C. Ockey of the United States Department of Agriculture.

The importance of the citrus industry to Florida is indicated by the fact that it represents 50 percent of the farm income from cultivated crop production in the state.

For a long time Florida was first in grapefruit production. During the early twenties, Florida supplied 90 percent of the nation's grapefruit. Today, this state furnishes less than half of the total supply, because of big increases in grapefruit production in other areas.

Texas is Florida's most serious competitor. The first big crop in Texas came during the 1936-37 season and it was about three times the size of any previous crop grown in that state. This season's Texas grapefruit crop is about 11,000,000 boxes, nearly 2,000,000 boxes bigger than last season's and just 2,000,000 boxes under this year's Florida crop. Increases in grapefruit production have also taken place in the California-Arizona area, but the amount of grapefruit involved is about a third of that grown in Texas.

Grapefruit production is expected to continue to rise as the large number of young trees increase their bearing surface. Department of Agriculture figures indicate that national crops of grapefruit may average over 30,000,0000 boxes a year, while during the period from 1931 to 1936, crops averaged 16,869,000 boxes a season.

The biggest increases are expected to take place in Texas. Florida's grapefruit crop is expected to be just a little bigger than it has averaged in recent years. Continued increases in the California-Arizona area are also expected because of the relatively large number of young trees.

Most of the young grapefruit trees are in Texas. For the most part, these are just coming into bearing. Texas has over three times as many trees from 5 to 10 years old as Florida. As these trees get older, they bear more fruit because of increased bearing surface. Most of the trees in Florida are already in full bearing.

The sharp increase in grapefruit production in Texas has forced the industry in that state to expand its markets. As a result, increasing quantities of Texas grapefruit have been coming into markets previously held almost entirely by fruit from Florida. Practically all of the Florida grapefruit is sold east of the Mississippi river, mainly in the Northeastern states. Texas grapefruit is sold mostly in the central states. But as production in Texas increases more and more Texas grapefruit may be expected to come into competition with grapefruit from Florida.

The orange situation indicates a continued increase in production, but at a more moderate rate than has been the case in the last few years. The biggest increase in volume is expected to take place in Valencia and other late varieties which have most of the young trees.

The amount of oranges produced over the next few years is expected to average from 60,000,000 to 65,000,000 boxes compared with an average of around 53,000,000 boxes a season in the period from 1931 to 1936.

Florida oranges are sold mainly in markets east of the Mississippi river, most of them being marketed along the eastern seaboard. During the Florida shipping season Florida oranges virtually dominate the eastern markets.

The big increases in production which took place since the late twenties and continued in recent years, came at a time when consumer purchasing power was falling and reached an extremely low level in the 1932 depression. The gains which the citrus industry has made since that depression period have been due largely to increases in the income of consumers which permitted the sale of larger supplies of oranges and grapefruit at the relatively lower prices.

While Florida growers are wrestling with the problem of how to market bigger citrus crops to better advantage, it looks as if some efforts will have to be made to lower production costs and produce quality fruit more efficiently.

This was indicated by R. H. Howard of the Extension Service staff who pointed out that a period of low prices was no time to try saving on fertilizer and other necessities required to produce a good yield and high quality fruit.

He said records show that about 38 per cent of the cash cost for taking care of a grove represented an outlay for fertilizer. These records indicate that of all the items of cost involved in growing citrus fruit, the amount spent for fertilizer paid greater dividends for every dollar invested than any other item of expense. Growers apparently have not realized this, because during periods of low prices they are inclined to reduce the amount of fertilizer applied when in reality it may pay them to increase the quantity. The reduced amount of fertilizer applied has been found to cut the net returns

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by lowering the yield.

Other steps which growers are taking to cut costs include more efficient use of equipment necessary in caring for groves. Since the average citrus grove in Florida is too small to warrant the expensive machinery and equipment which is necessary, there has been a tendency to consolidate production units to facilitate the buying and operating of this equipment with savings to the average grower.

How returns to growers may be sareguarded through proper spraying and dusting to prevent damage from insect pest and disease, was discussed at the meetings by J. R. Watson and W. L. Thompson of tJhe Experiment Station.

R. M. Barnette and R. V. Allison of the Experiment Station discussed practices in handling Florida's citrus soils in order to produce quality fruit more profitably. Other production problems were dealt with by Ed. L. Ayers, county agent of Manatee county, and H. H. Hume of the Experiment Station.

Growers attending the 29 citrus meetings showed a genuine desire to obtain the facts relating to their production and marketing problems. Many of them expressed the view that a better understanding of these problems was necessary before steps could be taken to work out satisfactory solutions.

STATE PLANT BOARD PROBLEMS

(Continued from Page 7)

without returns from the state's agriculture Florida would be in a sad plight indeed.

Why do we take this opportunity to remind you of these things, facts and considerations which most of you regard from the standpoint of history rather than as vital present and future factors in the welfare of all of us? Simply this. Many of the state's great horticultural leaders who helped fight the batties against citrus canker and Mediterranean fruit fly have passed to the great beyond and a generation of younger horticulturists has largely taken their place. To these younger men citrus canker and Mediterranean fruit fly appear as hazy matters of history—just as does the Civil War. Without careful deliberation they assume that such calamities and near-calamities are things of the past and cannot occur again. Such an attitude is indeed a dangerous one and if persisted in can only be the precursor of trouble to come. Also, present day developments in rapid transportation particularly by air, increase each year the opportunities for new pests to reach us and, be it said here, America has not yet received more than a very small per cent of the destructive plant pests which occur throughout the world.

If our agricuitural industries are to be maintained in a prosperous condition, protective and precautionary measures must be applied on a greater scale than ever before. Another phase of the situation, so far as the citrus grower is concerned, is that each new and additional pest increases the cost of production. It is easily possible for production costs to consistently exceed returns and when that happens the end of an industry is inevitbale.

The State Plant Board organization has faithfully served your interests for 23 years and the protection it has given you has undoubtedly been the most profitable form of insurance your industries have ever enjoyed. It will continue to serve you, but it can do so only if supplied with the necessary finances for its activities. We mention this frankly for there is a disposition on the part of legislatures to severely curtail appropriations for the Plant Board during those periods when the state does not appear to be faced with an imminent calamity.

It is necessary to maintain at all times efficient quarantine, grove and nursery inspection and, in addition it is most important that the legislature provide an adequate emergency fund for instant use in the event of a new and serious pest making its appearance in the state. Such an emergency fund, of $50,000 for each biennium, available for use by joint action of the Governor and the State Plant Board, was appropriated by each legislature from 1923 to 1935, inclusive. In only three instances was any part of the emergency fund used: $10,000 for suppression of coconut bud rot in 1924, $20,000 for citrus aphis control in 1925-26 and $50,000 in the Mediterranean fruit fly campaign of 1929. Thus, out of $350 - 000 in emergency appropriations from 1923 to 1935, inclusive, only $80,000 was used.

However, the 1937 legislature provided an emergency appropriation of but $10,000 for the two years. Had not the emergency fund of $50,000 been available for immediate use when the Mediterranean fruit fly appeared in 1929, it is extremely doubtful whether men and resources could have been assembled quickly enough to check the pest before eradiction would have become impossible. It is safe to venture the opinion that the $10,000 emergency fund available for the present biennium would be far from sufficient to meet any real emergency should it occur.

The extent to which the Plant Board will be able to serve and protect your interests in the future will be directly dependent upon the extent to which YOU make the Plant Board's responsibility your responsibility and the extent to which you see that it receives both moral and financial support.

CITRUS PRACTICES IN THE INDIAN RIVER SECTION

(Continued from page 15)

there are 1420 grapefruit trees and 1125 orange trees.

We use chemicals and not mixed fertilizers and apply them separately.

During the month of January we applied 2400 pounds of Nitrate of Potash on this grove at a cost of $95.23. On the marl lands we applied 3300 pounds of Manganese Sulphate which cost $118.80. In February we applied 2200 pounds of Calcium at a cost of $93.50. This material was used on the marl soil having the high pH reading of eight and above. We applied 6700 pounds of Calcium Nitrate at a cost of $128.96.

In April we were able to purchase ashes produced from the burning of cotton hulls which ran high in potash, 14,700 pounds at a cost of $135.40. During this month we also applied Sulphate of Potash, 8000 pounds at a cost of $240.00.

In July we applied 1600 pounds of Muriate of Potash at a cost of $36.80 In August we applied 100 pounds of Manganese Sulphate at a cost of $3.20.

In September we applied 4600 pounds of Muriate of Potash at $92.00.

In December we applied 2800 pounds of Lime which cost 25.90.

We generally spray four times a year. We gave the grove a dormant spray in January with a copper spray to control lemon scab which occurs more frequently in our area than in some other areas in the state.

In April the grove was sprayed with copper solution to control scab and melanose. In May we sprayed with lime sulphur to control rust mite and in June we sprayed with an oil

(Continued on page 22)

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Citrus Fruits, Diseases & Pests

Control Measures For Citrus

J. R. Watson
ENTOMOLOGIST
FLORIDA EXPERIMENT STATION

The mean temperature of last month here at Gainesville was more than five degrees above normal, whereas the rainfall was less than half of normal. These conditions, we believe, were general over the peninsular portion of the state where citrus is grown. This has resulted not only in a rise of rust mites in our groves but also in a heavy infestation of the 6-spotted mite in many sections. Fortunately the control of the 6-spotted mite and the rust mites may be combined in a single spray.

The 6-spotted mite attacks especially grapefruit. It congregates in large colonies on the undersides of the leaves, from which it sucks the sap, causing these spots to turn light yellow in color, and if the infestation is heavy enough the leaves will drop. Needless to say, the dropping of these young leaves at this time of the year is a serious drain on the vitality of the trees, and may result in the dropping of the fruit. Already reports have come in that as many as half the leaves have dropped from some grapefruit trees. The situation is sufficiently serious that our growers must be on the lookout for the 6-spotted mite, particularly on grapefruit, and if abundant the trees should be sprayed at once. Yellow spots occurring on the leaves are the most visible signs of the mites but one with good eyes can see the mites themselves on the undersides of the leaves and the use of a hand lens magnifying about ten times will make them easily visible. They are pale yellow in color, with six rather indistinct marks on the body.

The purple mite also is rather common at the present time. This, as its name indicates, is of a reddish color and unlike the 6-spotted mite, is more apt to attack the upper sides of the leaves, which instead of turning yellow in spots turn an ashen gray, losing the bright green luster of a healthy leaf. This mite too can be controlled with the same spray.

The control of all three of these pests, like most members of the spider family, calls for the application of sulfur in some form: the elemental sulfur itself or some of its compounds, usually lime-sulfur or wettable sulfur. It can be applied either as a dust or a spray. Which of these the grower will find more economical will depend upon many factors, including the size of the grove, his equipment, the weather and which of these three pests he finds on his trees at this time.

Dusting will be effective for rust mites but for the red spiders, both the purple mite and the 6-spotted mite, spraying will be more effective, particularly if the weather should turn off somewhat cooler. The big advantage of dusting is the rapidity with which it can be applied. This appeals particularly to owners of large groves. It enables them to cover their groves quickly and thus gain control of rust mites at the beginning of the infestation. Usually one with a power duster can cover his grove in about one-tenth of the time it takes to spray, although this will depend upon how handy water is. Of course, with the use of an airplane this can be still further reduced. However, if the application of a dust is followed in about three days with a heavy rain one does not ordinarily get as good control of rust mites as with a spray since the dust is more easily washed off. Furthermore, one cannot economically dust if much wind is blowing.

It is important that the sulfur be finely ground — the more finely ground the better, up to the limit where its cost becomes excessive. To make it go through the duster more effectively sulfur is commonly diluted with about five per cent of lime, in other words, five pounds of lime to 95 pounds of sulfur.

Sprays will be more effective for the 6-spotted mite, and special care must be given to the undersides of the leaves. They must be thoroughly covered. Lime-sulfur is the spray which has been long used. Concentrations will vary from 1 to 40 at this time of the year to 1 to 65 or even 75. The higher concentrations, of course, are more liable to burn tender fruit and foliage, and the young leaves of grapefruit are tender at this time of year so the higher concentrations should be avoided on grapefruit trees.

During the last three years the practice has become general of putting into each 100 gallons of lime-sulfur from five to ten pounds of wettable sulfur This serves two purposes. In the first place, the addition of this extra amount of sulfur enables the growers to cut down on the concentration of lime-sulfur and therefore have a safer spray. By using ten pounds of wettable sulfur per 100 gallons one can reduce the lime-sulfur content to as low as 1 to 65 or even 75 in hotter weather. This makes a much safer spray than the heavier concentrations of lime-sulfur. Wettable sulfur is also an excellent spreader, enabling one to get better coverage, which is one of the essentials of rust mite control, as well as that of red spiders. At this time of the year rust mites are apt to be on the leaves and twigs as well as on the old fruit and will soon be appearing on the young fruit, especially grapefruit, so thorough coverage of the trees is essential.

The time is approaching, if not already here, when many growers will be spraying their trees with bordeaux as a control for melanose. This gives them an opportunity to make a combination spray. From five to ten pounds of wettable sulfur to each 100 gallons of bordeaux will make an excellent spray for rust mites, as well as melanose. The bordeaux sticks to the trees and holds the sulfur so that the control spreads over a longer period of time. Wettable sulfur and bordeaux can also be added to zinc compounds if these are being sprayed on the trees.

Rust mites hit the pocketbook of the growers from four directions. In the first place, rusty fruit uniformly brings a lower price than bright fruit. Russet fruit is smaller than it

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would have been had rust mites been kept off. The diminution in size may be largely in the thickness of the rind but it takes more rusty fruit to fill the box than it does bright fruit. Furthermore, many small fruits that might have been large enough to market had the rust mites been controlled, may become so small as to be culls.

Rusted fruit will not keep as well as bright fruit; there is more decay in transit. It is very probable, though we have very little data on the subject, that rust mites also injure the leaves and general health of the tree. Leastwise, one who wishes to get the most from his crop of citrus must control rust mites.

The season of the year when rust mites are most likely to be destructive is from now until sometime after the summer rains begin in June or July, although there is no season of the year when one can be perfectly secure from rust mites. The rainy season of the summer is least likely to have a heavy infestation of rust mites. However, the cessation of the rains for a week or ten days will often bring on an infestation even at that time.

VALUE OF "LIVE-AT-HOME" PRACTICES FOR CITRUS GROWERS

(Continued from page 17)

ly. A variety of honey-made baked goods for the first time had a place in the premium list of the Florida Fair at Tampa. Recipes for the use of honey have been distributed and honey-made products exhibited at the Florida Orange Festival and at the Central Florida Exposition, Orlando.

Beekeeping, records show, is profitable when the colonies are given the particular care required. The agent in West Hillsborough county now reports 21 women with hives of bees as well as one 4-H club girl who has ten colonies and takes complete care of them herself.

From Brevard County on the east coast, famous for orange, palmetto and mangrove honies, the agent tells us that honey sold from roadside stands brings a much better price than when sold to wholesale houses.

It is important that farm families conserve a large supply of canned foods from the planned surplus of home gardens and orchards and from available trucking fields when seasons are favorable to good production.

The family that saves or stays out of "the red" in 1938 must decide to "Live-At-Home" and use much of the cash for things that cannot be produced and conserved at home.

● Old Uncle Natchel — known for his faith in Mother Nature and her own product, Natural Chilean Nitrate of Soda.

CHILEAN NITRATE OF SODA is the only natural nitrate. Guaranteed 16% nitrogen, it also contains a natural blend of small quantities of other plant food elements.

Many of these elements, such as iodine, boron, calcium, zinc, copper, iron, manganese and magnesium, in addition to phosphorus, nitrogen and potassium, are necessary to plant and animal life for normal good health, growth, quality and yield.

Therefore, Natural Chilean Nitrate is agriculturally valuable both as a source of nitrate nitrogen, and to furnish, or build up a reserve of small amounts of other plant food elements naturally blended with it, and is correspondingly well suited to meet the exacting needs of your crops.

American farmers have used Natural Chilean Nitrate successfully and profitably for over 100 years.

NATURAL CHILEAN NITRATE OF SODA

CITRUS PRACTICES IN THE INDIAN RIVER SECTION

(Continued from page 19)

spray to control scale. During the last days of September the grove was sprayed with Lime Sulphur to further protect the fruit against rust mite.

The total cost of spraying and applying fertilizer and other labor costs on this grove was $1,850.99. The total cost of materials was $1,597.39 or a grand total of $3,448.38.

The grove produced 13,264 boxes of fruit at a cost of .2599 per box. There was a total net profit of $12,303.05.

During January we applied Manganese on the ground at the rate of five to six pounds per tree on the trees growing on marl. Since that time we have been spraying our trees with a five per cent solution of Manganese and five per cent zinc and have been getting as good results as when the material was applied to the ground.

We are now following the practice of adding from eight hundred to one thousand pounds of Dolomite per acre annually to our acid lands.

You will note that no phosphate was applied during the year of 1934-35. A ton and a half per acre of Colloidal Phosphate had been added to this grove in previous years and it was not thought necessary to add phosphate.

Earlier in this paper I said we had a fluctuating water table. It might be interesting to the growers in the higher lands of the state to know that we had a flood condition in the area where this grove is located this past season and this particular grove stood waist deep in the water furrows for more than a week. It did not drop its fruit and is in as fine condition today as you would expect any grove to be in at this time of year.

It has been written that the orange tree can stand more rough useage than any other tree. If you could have seen this grove during the flood time and could see it today you would believe that this is a true statement.

"Yep!" said the farmer, "When a fellow has to know the botanical name of what he raises, and the entomological name of the bugs that eat it, and the pharmaceutical name of what he sprays on it — things is bound to cost more!

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FOR SALE—2000 Riverside No. 10 Grove Orchard Oil Heaters used only two seasons, excellent condition. 70c each, F.O.B. Marianna subject to prior sale. Marianna Fruit Company, Marianna, Fla.

ALYCE CLOVER SEED. Ripe and cleaned. Ideal cover and hay crop, Write for information. P. E. Synder, Box 866, Lakeland, Fla.

SEEDS—ROUGH LEMON, SOUR ORANGE, CLEOPATRA. Pure, fresh, good germination. Also seedlings lineout size. De Soto Nurseries, DeSoto City, Fla.

SCENIC HIGHWAY NURSERIES has a large stock of early and late grapefruit and oranges. One, two and three year buds. This nursery has been operated since 1883 by G. H. Gibbons, Waverly, Fla.

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STANDARD varieties of citrus trees including Persian limes and Perrine lemons at reasonable prices. Ward's Nursery, Avon Park, Fla.

THOUSANDS of Rough Lemon Seedlings, six to twenty inches high. $1.50 per hundred; $12.50 per thousand; ten thousand or more at $10.00 per thousand. Strong field grown plants. INDIAN ROCK NURSERIES, Largo, Florida.

Very desirable buds on sour orange root. Valencias, Hamlins and Jaffas. Also sour orange seedlings. Prices on request. Nursery at Blanton, Fla. Copothorn Groves, Inc., "Bob Thornton" and "Rox Pollard". P. O. Box 310, Tampa.

CAUSERIENCE LEPIDOFLOIA—(So-called Brazilian oak), resembles Australian pine. Grand for wind-breaks. Cold resistant. Beautiful. Send for sample of foliage. $6.00 per 100. S. S. Matthews, Homestead, Fla.

HARDIN'S SPERRYOLA Lemon, a profitable adapted commercial variety for all sections. Hardy, prolific grower and producer. Limited number choice trees. Hardin Nurseries, Box 63, Lakeland, Fla.

CITRUS NURSERY TREES, standard and new varieties on Cleopatra and Sour. Priced from $6c up. Grand Island Nurseries, Eustis, Fla.

SEED—Rough lemon, sour orange, cleopatra. New crop from type true parent trees. Also thrifty seedlings. DeSoto Nurseries, DeSoto City, Florida.

NEW COMMERCIAL lemon for Florida, the Perrine; proven. All residents need yard trees, keeping Florida money at home. Booking orders for budded stock for Winter delivery. DeSoto Nurseries, DeSoto City, Fla.

CITRUS SEEDLINGS, all root stock varieties. $10.00 per 1000 up. Grand Island Nurseries, Eustis, Fla.

BUDDED trees new Florida commercial lemon, proven, thin skinned, juicy, scab immune. Also rough lemon, sour orange and Cleopatra seed and liningout seedlings. DeSoto Nurseries, DeSoto City, Fla.

WANTED—To hear from owner having good farm for sale. Cash price, particulars. John Black, Chippewa Falls, Wisconsin.

CROTALARIA SPECTABILIS, fresh crop, scarified, $15.00 per 100 lbs. F. O. B. Eustis. GRAND ISLAND NURSERIES, EUSTIS, FLA

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QUIT TOBACCO easily, inexpensively, without drugs. Send address. Ezra Stokes, Mohawk, Florida.

ALYCE CLOVER, the best legume for hay or covercrop. Write for information. Hardin Groves, Box 63, Lakeland, Fla.

UP to $20.00 paid for Indian Head Cents; Half Cents $125.00; Large Copper Cents $500.00, etc. Send dime for list. Romancoinshop, D. Springfield, Mass.

FOR SALE—Small packing house machinery and equipment complete. Apply Hector Supply Company, Miami.

CROTALARIA SPECTABILIS — Fresh crop, $15.00 per 100 lbs. f. o. b. Frostproof, Fla. Milton Woodley, Frostproof, Flo.

FOR SALE—Practically new 25 gal. capacity Hardie super mogul sprayer equipped with 14 h. p. 4 cy. Novo engine, 500 gal. tank mounted on Chev. chassis with dual wheels, ten ply tires. Sprayer used equivalent to one season. Perfect condition. Sprayer cost new $1050 plus present value truck $450. Will sacrifice all for $750 or will trade for smaller sprayer and difference. C. O. Reiff, Marianna, Fla.

Better Growers Use Our Planned Production Program. Designed for your grove. Soil analysis and interpretations. Sound, Safe, Profitable. J. G. LAWTON, Research Chemist, Bartow, Fla., Phone 8804.

"MAIL ORDER Operator desires contact with grower of high grade avocado pears. Have interesting proposition for grower of highest quality fruit." F. R. Gardner, P. O. Box 528, Greenville, Pa.

ROSE BUSHES — Guaranteed 2-Yr. old fieldgrown everblooming varieties. Fall planting best. Free catalog. Tytex Rose Nurseries, Tyler, Texas.

CITRUS TREES — Offer about 100 Valencia orange trees, 2 to 2¾ in. caliper, 75c; 150 Duncan grapefruit, 2 to 3½ in. caliper, 65c. On sour stock delivered your truck here. J. K. Christian, McIntosh, Fla. Marion County.